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TEA QUARTERLY  
THE JOURNAL  
OF THE  
TEA RESEARCH INSTITUTE  
OF CEYLON

Edited by  
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THE TEA RESEARCH INSTITUTE  
St. Coombs, Talawakelle,  
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# THE TEA QUARTERLY

VOLUME XXIII.

MARCH, 1952

PART I

## IN MEMORIAM

**THE RIGHT HONOURABLE DON STEPHEN SENANAYAKE, P.C.**

**PRIME MINISTER OF CEYLON 1948—1952**

The reputation of the late Mr. D. S. Senanayake as a world statesman has already been so firmly established during his lifetime as to make any further eulogies superfluous and presumptuous.

It may not, however, be so well known that, in spite of his multifarious other activities, Mr. Senanayake found time to represent the Low-Country Products Association on the Board of the Tea Research Institute of Ceylon from the 5th September, 1928, until the 26th October, 1931. This period corresponded with the transfer of the laboratories to St. Coombs and Mr. Senanayake was thus one of those primarily responsible for the establishment of the Institute in the form in which it exists today.

Throughout his subsequent career Mr. Senanayake maintained his keen interest in the Institute and, whilst Minister of Agriculture, was instrumental in ensuring that our position was fully safeguarded in connection with the various legislative enactments passed by Government for the better regulation of the tea industry.

Our deepest sympathy is extended to his widow and family in their irreparable loss.

**G. B. P.**



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# STUDIES IN BLISTER BLIGHT CONTROL

## IX. THE EFFECT OF SPRAY RESIDUES ON THE QUALITY OF MANUFACTURED TEA

By

E. L. Keegel

*Work in the biochemistry section of the Institute has shown that the fermentation of tea is due, primarily, to an enzyme which is a compound of protein and copper. Long before blister blight arrived in Ceylon, it was shown that the injection of copper into tea bushes increased the rate of fermentation. It was also possible to demonstrate on one of the clonal rows<sup>1</sup> that absorption of copper compounds through the leaves of the tea bush occurred in certain circumstances.*

*All this work had to be taken into account when choosing suitable fungicides for use against blister blight. Highly insoluble forms of copper such as cuprous oxide and copper oxychloride are recommended.*

*\*The question arises, do these insoluble copper compounds affect fermentation and quality when used as fungicides? Mr. Keegel gives all the available information in the following article.*

The Loss of Crop Experiment carried out on No. 8 field of St. Coombs estate provided leaf with which to investigate the possible effect, upon quality of liquor, of fungicidal sprays containing copper.

The experimental area of six acres was divided into three plots, each of two acres.

*Plot A.* was left unsprayed through the experiment.

*Plot B.* Spraying began after the first pluck and continued until the twenty-sixth pluck. The plot was again sprayed a day after the thirty-second pluck, and spraying continued till the end of the experiment. (Both monsoons).

*Plot C.* Spraying began after the first pluck and continued until the fifteenth pluck, after which it was not sprayed until the next South West monsoon period.

To all intents and purposes the plots in question were as comparable as possible, and the standard of plucking of the leaf taken for manufacture rigidly controlled.

Owing to the different treatments given to B and C, it is found necessary to treat the results of the experiment under certain well defined groups. In this way the effect of cessation of spraying in the treated plots may be studied as well.

- |          |   |   |
|----------|---|---|
| Group 1. | — | 2nd-16th pluck (May-September 1950).<br>Both B & C sprayed.   |
| Group 2. | — | 17th-22nd pluck (September-November 1950).<br>B sprayed. C not sprayed.<br>C was not manufactured after the 22nd pluck.             |
| Group 3. | — | 2nd-22nd pluck (May-November 1950).<br>Comparison of B and C with A for the whole of the<br>period during which C was manufactured, |

- Group 4. — 2nd-26th pluck (May-December 1950).  
Comparison of B with A for the period during which the former was sprayed.  
(Note—27th pluck not manufactured).
- Group 5. — 28th-32nd pluck (January-February 1951).  
This group represents the period during which B was not sprayed.
- Group 6. — 33rd-41st pluck (February-May 1951).  
Comparison of B with A when spraying of the former was resumed. (Note—36th pluck not manufactured)
- Group 7. — 2nd-41st pluck (May 1950-May 1951).  
Comparison of B with A for the whole period of the experiment.

### Results

The three main grades, B. O. P., F. P., and Fannings, which represent over 75% of the leaf, of each manufacture were examined by three Colombo Tasters and the results are set out below :—

#### Group 1. Comparison of Control A and plots B and C (both B and C sprayed)

No. of manufactures	..	15
Average copper content	..	A—31 parts per million
" " "	..	B—49 " " "
" " "	..	C—52 " " "

Table 1. Comparative Valuations (A taken as standard.)

Grade	Sample	Appearance	Colour	Strength	Quality	Value in Cents
B.O.P.	B	e	e	e	e	— 2
	C	e	e	e	e	— 3
F.P.	B	e	e	e	e	— 2
	C	e	e	e	e	— 2
Fannings	B	e	e	e	e	— 1
	C	e	e	e	e	— 3

Note : e—equal.

A resulted in higher values than B or C on 9 occasions

B " " " " " " A or C " 4 "

C " " " " " " A or B " 2 "

Infusion—Up to the 6th manufacture all tasters agreed on the infusion of the standard (A) having been duller than the other two. From the 7th manufacture, however, the infusion of A was consistently considered to be the best till the 13th manufacture, after which the treated samples were given preference.

#### Group 2. Comparison of A, B and C during the period C was not sprayed.

No. of manufactures	..	6
Average copper content	..	A—28 parts per million
" " "	..	B—57 " " "
" " "	..	C—28 " " "



Table 2. Comparative valuations (A taken as standard.)

Grade	Sample	Appearance	Colour	Strength	Quality	Value in Cents
B.O.P.	B	e	e	e	e	+ 1
	C	e	e	e	s.b.	+ 7
F.P.	B	e	s.b.	e	e	0
	C	e	e	e	s.b.	+ 6
Fannings	B	e	s.b.	e	e	+ 3
	C	e	e	s.b.	s.b.	+ 7

Note : s.b.—slightly better.

C resulted in higher values than A or B on all six occasions  
Infusion.—C was distinctly better and brighter than the other two.

**Group 3. Comparison of B and C with A for the whole of the period during which C was manufactured.**

Results in Groups 1 and 2 combined.

No. of manufactures .. 21  
Valuations .. No difference in appearance, colour, strength and quality.

Average value of A 1 cent higher than B, but equal to that of C.

A resulted in higher values than B or C on 9 occasions

B " " " " " A or C " 4 "

C " " " " " A or B " 8 "

**Group 4. Comparison of B with A for the period during which the former was sprayed.**

No. of manufactures .. 25  
Average copper content .. A—30 parts per million  
" " " " " B—53 " " "

Valuations—No difference

A resulted in higher values than B on 12 occasions

B " " " " " A on 13 "

Infusion—B better for first six plucks.

A better from the seventh to the thirteenth pluck.

B brighter again from the fourteenth pluck, improving with each successive manufacture.

**Group 5. Comparison of B with A, when spraying of B was stopped (Dry weather period)**

No. of manufactures .. 5  
Average copper content .. A—30 parts per million  
" " " " " B—33 " " "

Table 3. Comparative valuations (A taken as standard.)

Grade	Sample	Appearance	Colour	Strength	Quality	Value in Cents
B.O.P.	B	e	s.b.	e	s.b.	+15
F.P.	B	e	e	e	s.b.	+14
Fannings	B	e	e	e	s.b.	+10

B resulted in higher values than A on all 5 occasions.

Infusion—B was distinctly brighter and more coppery. A was inclined to be greenish.

**Group 6. Comparison of B with A when spraying of the former was resumed.**

No. of manufactures	..	8
Average copper content	..	A—29 parts per million
"      "      "	..	B—57 " " "

*Table 4. Comparative valuations (A taken as standard.)*

Grade	Sample	Appearance	Colour	Strength	Quality	Value in Cents
B.O.P.	B	e	e	e	e	+ 5
F.P.	B	e	e	e	e	+ 3
Fannings	B	e	e	e	e	+ 4

A resulted in higher values than B on 2 occasions

B " " " " " A on 6 "

Infusion—On the whole B was better coloured and brighter.

**Group 7. Comparison of B with A for the whole period of the experiment.**

Total number of manufactures..	38
Average valuations	..
No difference in appearance, colour, strength and quality. Average value of B 3 cents higher than A.	

A resulted in higher values than B on 14 occasions

B " " " " " A on 24 "

**Conclusions**

It must be mentioned that the control (unsprayed) plot suffered severely from blister blight attack on only a few occasions during the South West monsoon period of 1950. The damage throughout this period was not sufficiently great to give rise to brownish flake in the tea. In consequence the appearance of the made tea from the unprotected plot was not noticeably affected. It must be remembered, however, that badly blistered leaf brings about a considerable amount of flake, which is characteristic and distinguishable.

By the end of the monsoon period the sprayed plots were of outstanding appearance and yield figures bore testimony to their health and vigour.

On the other hand, fields which recover from bad attacks of blight tend to give vigorous flush when the weather improves, but a prolonged attack slowly exhausts the bushes and their recovery becomes more and more delayed.

Practically all the variations in the results given could be explained on these grounds, taking into account the errors in plucking, in manufacture, and in tasting. It is not possible, entirely, to exclude absorption of small amounts of copper with some effect on quality, but there is insufficient evidence to make any further discussion worthwhile.

The really important conclusion is that, on the average, better teas result from sprayed areas than from comparable areas unprotected from the ravages of blister blight disease.



Finally, it would be useful to refer to the effect of overspraying upon quality. An area of tea was deliberately oversprayed and the resulting copper content of teas made from this area was over 250 parts per million. The tasters unhesitatingly condemned the teas as being plain and unattractive liquors with no quality. The infusions were dull and dark greenish. This fits in well with the earlier biochemical experiments on the effect of copper on fermentation, where it was found that excess copper tends to the formation of a copper chlorophyll which is not oxidised during fermentation, and which imparts a green colour to the infusion.

Since there is apparent absorption from an excess of fungicidal spray, there is a possibility that small amounts of copper sufficient to stimulate fermentation are actually absorbed in the course of routine sprayings with wholly beneficial effects.

### Reference

- (1) Lamb, J.—Report of the Biochemist for 1944, Bulletin No. 26, p. 54, 1945.

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## STUDIES IN BLISTER BLIGHT CONTROL

### X. EVALUATION OF SOME COPPER CONTAINING FUNGICIDAL DUSTS IN THE CONTROL OF BLISTER DISEASE OF TEA

By

C. A. Loos

In a recent publication Haworth<sup>1</sup> reported on the copper deposited on glass plates, placed at varying distances from a power dusting machine, when certain copper dust formulations were tested, under the steady wind conditions prevailing in a railway tunnel. In those experiments the greater part of the copper, even in the best formulations, was deposited within 150 feet of the dusting machine. Plates beyond 150 feet received comparatively little copper although dust clouds emerged from the opposite end of the tunnel 680 feet away. Plates set between 10 and 75 feet from the machine showed very considerable copper deposits, indicating that the greatest fall of copper, under drift conditions, occurred between 25 and 75 feet from the dusting point. The blast from the power duster may be considered to have dissipated itself within 25 feet of the machine. It is, therefore, reasonable to assume that if the dust is dependent on wind drift for a fairly even distribution of copper it is advisable to dust in swathes or bands of 50–75 feet width.

Efficient dusting of large areas of tea, exclusively by means of a power duster, will in consequence only be possible in areas with a network of roads which will facilitate applications under varying wind conditions. Obviously, no such road systems exist on tea estates, and it is unlikely that they ever will.

Power dusting may, however, be replaced or supplemented by hand dusting with portable machines sufficiently light and convenient for a labourer to carry between the fairly closely planted tea rows.

The experiment described in this publication was designed to test dusting by means of the portable hand operated duster. Although the results of Haworth's tests were not available at the time the experiment was designed, the layout proved to be quite satisfactory.



Haworth's tunnel tests were on dust formulations identical with those employed in this experiment. The five proprietary dusts issued as 13 formulations were as follows :—

- (1) Universal Crop Protection Ltd.—Cuprosana 2% copper as oxychloride (European manufacture).
- (2) Imperial Chemical Industries Ltd.—Perelan 2% as cuprous oxide. (Indian manufacture).
- (3) Imperial Chemical Industries Ltd.—2% copper as oxychloride. (Indian manufacture).
- (4) Colombo Commercial Co., Ltd.—2% copper as oxychloride. (Continental manufacture).
- (5) Robins—2% copper as oxychloride. (American manufacture).
- (6) Robins plus Bentonite—2% copper as oxychloride. (American manufacture).
- (7) Universal Crop Protection Ltd.—Cuprosana 4% copper as oxychloride.
- (8) Imperial Chemical Industries Ltd.—Perelan 4% copper as oxide.
- (9) Imperial Chemical Industries Ltd.—4% copper as oxychloride.
- (10) Universal Crop Protection Ltd.—Cuprosana 6% copper as oxychloride.
- (11) Colombo Commercial Co., Ltd.—6% copper as oxychloride.
- (12) Imperial Chemical Industries Ltd.—Perelan 8% copper as oxide.
- (13) Imperial Chemical Industries Ltd.—8% copper as oxychloride.

Each formulation was tested at three application rates, the application in each case being through the 'Orient' hand duster as supplied by Messrs. Walker Sons & Co., Ltd., Colombo :—

- 5 lbs. per acre every 5 days.
- 10 lbs. per acre every 5 days.
- 10 lbs. per acre every 10 days.

In addition to the above, Cuprosana 2% copper formulation has been tested at application rates of  $7\frac{1}{2}$ ,  $12\frac{1}{2}$  and 15 lbs. per acre, at five day intervals, in the hope that an application rate would be found at which total control of blister blight would be possible.

To assess the degree of protection afforded by the dusts, two plots were left unprotected and two plots sprayed at ten-day intervals with Perenox at a concentration of 4 ounces in 10 gallons water, at an application rate of 15-17 gallons per acre.

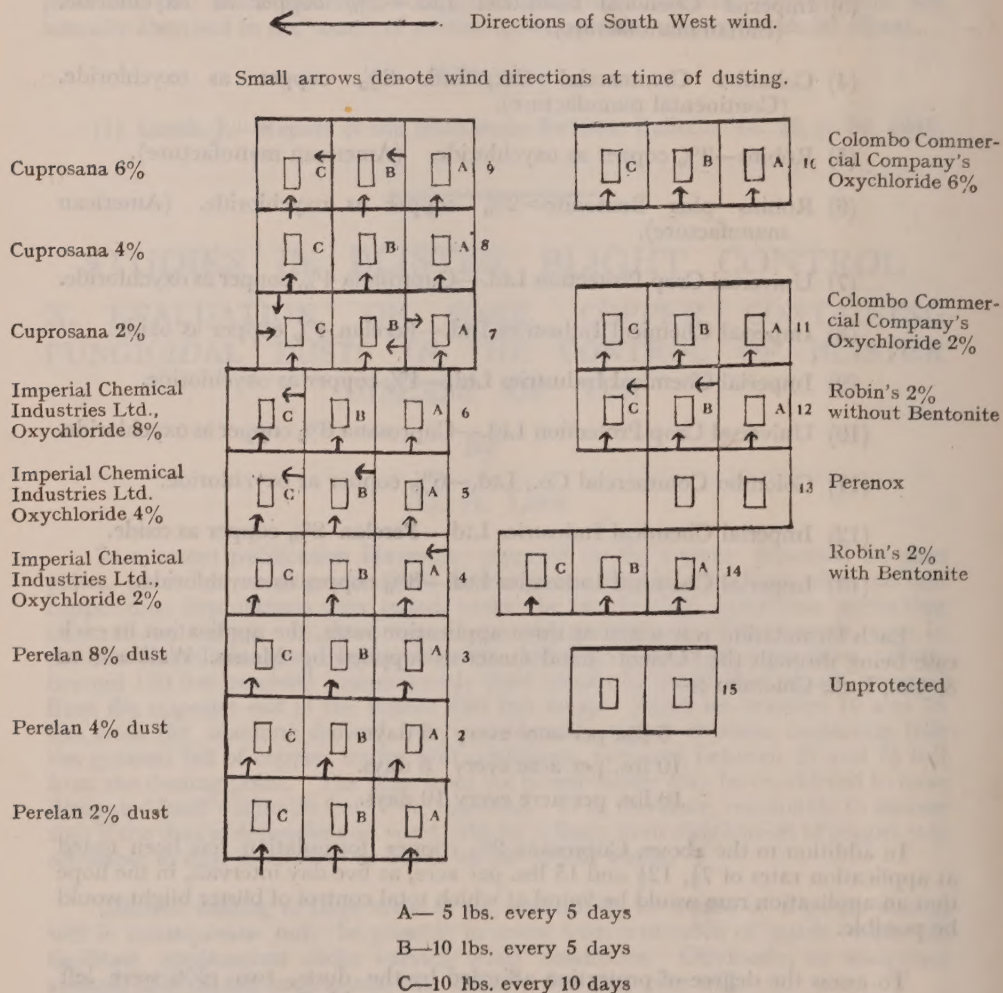
### Experimental Plots

The area selected was a fourth year field on the Cairness Division of Mattakelle Estate, Talawakelle. Each plot was approximately one sixth of an acre in extent (80 ft.  $\times$  90 ft.) in the centre of which observation sub-plots 30 ft.  $\times$  20 ft. were marked out. All observations and evaluations were made in these central sub-plots

the boundaries of which were at no point more than 60 feet from the boundaries of the main plot along which the duster was operated. The plan of the plot layout is shown on the wind direction diagram below:—

# DIAGRAM I

Plan of experimental area showing wind directions during dustings  
on 24th July, 1951.



C

B

A

↑

↑

↑



## Weather Conditions

The experiment commenced a few days after the break of the south west monsoon rains on May 29th 1951. Unfortunately, conclusive results with the dust formulations tested were not possible as the monsoon, while the experiment lasted, was comparatively light. The degree of control achieved during the period under review may not, therefore, be representative of control under more severe weather conditions.

Conditions favourable to blister infection did not commence until about the 20th of June. On July 3rd the average number of translucent spots on the 2nd fully expanded leaf of flush points was 2.13 on the unprotected area, and 0.09 on plots sprayed with Perenox. A week later the translucent spots developed into sporing blisters. The spores from these mature blisters would have taken a further 19 days to establish a second generation of blisters but the attack was checked by bright weather which set in on July 26th. This spell of fine weather lasted long enough to reduce the level of infection to insignificance even on the unprotected plots. At the observation on August 21st, the average number of infections on the 2nd leaf on flush points on the unprotected plot was 0.04 and 0.01 in the sprayed area. The disease continued at a low level until a sharp attack developed during the north east monsoon about the end of November. The prolonged and severe attacks normally experienced from July to October did not occur.

## Dusting and Wind Directions

As stated previously dusting was done along the boundaries of the main plots with every effort being made to cover the central observation or sub-plot as evenly as possible. The plots were laid out on a hillside with a south-west aspect, each plot having its side boundary running due north-east to enable the south-west winds to carry the dust over the plot while dusting from the plot base. This plan failed. Wind direction changed in a matter of seconds even over small areas and it was often necessary to dust the small sub-plots from three directions. The reproduction on Diagram I show wind directions over the experimental area during dusting under typical conditions. On no occasion during the 37 dusting operations was the wind entirely from one direction.

## Experiment Results

It was possible to make reliable comparative evaluations of control on two occasions only—21st July and 27th November. As the experiment was on a small scale, and replications of treatments were not possible, assessments could only be made in very general terms. In the case of 6% copper dust supplied by the Colombo Commercial Company Ltd. the poorer degree of control in comparison with the 2% dust cannot be adequately explained. A possible explanation is that the area over which the Colombo Commercial Company's 6% copper dust was used contained a fairly high percentage of good jat bushes as against the lower hybrid types, less susceptible to blister blight, occurring in the rest of the area.

Tables 1 and 2 give the assessment of control with the dust formulations and spraying in comparison with the blister incidence on the unprotected plots. This assessment is based on the following arbitrary scale:—

- |                 |                       |              |
|-----------------|-----------------------|--------------|
| (1) Very good   | (2) Good to very good | (3) Good     |
| (4) Fairly good | (5) Very fair         | (6) Moderate |
| (7) Fair        | (8) Indifferent       | (9) Poor     |

Table. 1. *Visual observations of control on 21st July, 1951.*

	5 lbs. every 5 days	10 lbs. every 5 days	10 lbs. every 10 days
<b>2 per cent. dusts :</b>			
Cuprosana	Fair	Very Fair	Indifferent
Perelan	Fair	Moderate	"
I.C.I. copper oxychloride	Indifferent	Indifferent	"
C.C.C. copper oxychloride	Fairly good	Good	Very Fair
Robins & Bentonite	Very Fair	Fair	Indifferent
Robins plain	Fairly good	Very Fair	Moderate
<b>4 per cent. dusts :</b>			
Cuprosana	Good	Good-V.G.	Very Fair
Perelan	Moderate	Very Fair	Fair
I.C.I. copper oxychloride	Very Fair	Fairly good	Indifferent
<b>6 &amp; 8 per cent. dusts :</b>			
Cuprosana 6%	Good	Good-V.G.	Good
Perelan 8%	Fairly Good	Good	Fair
I.C.I. copper oxy. 8%	Very Fair	Fairly Good	Very Fair
C.C.C. copper oxy. 6%	Fairly good	Good	Very Fair
Perenox sprayed at 10 day intervals		Good-V.G.	
Unprotected		Fair	

Table 2. *Visual observations of control on 27th November, 1951.*

	5 lbs. every 5 days	10 lbs. every 5 days	10 lbs. every 10 days
<b>2 per cent. dusts :</b>			
Cuprosana	Good	Good	Good
Perelan	"	"	Very Fair
I.C.I. copper oxychloride	"	"	Fair
C.C.C. " "	"	"	Good
Robins & Bentonite	Very Fair	Very Fair	Very Fair
Robins plain	Good	Good	Good
<b>4 per cent. dusts :</b>			
Cuprosana	Good	Very Good	Good
Perelan	Fairly Good	Fairly Good	Indifferent
I.C.I. copper oxychloride	Good	Good	Good
<b>6 &amp; 8 per cent. dusts :</b>			
Cuprosana 6%	Good-V.G.	Good-V.G.	Good
Perelan 8%	Good	Good	Good
I.C.I. copper oxy. 8%	Good-V.G.	Good-V.G.	Good
C.C.C. copper oxy. 6%	Fair	Fairly Good	Good
Perenox sprayed at 10 day intervals		Very Good	
Unprotected		Indifferent	



Control on the 21st July was less effective than that on 27th November. On the earlier date spraying gave a control assessed as good to very good in comparison with very good control on 27th November. The rains in July were light but almost continuous, probably causing a heavier attack than at the latter period of the north-east monsoon which is characterised by fine mornings. The degree of control was, in consequence, better when applied during more favourable weather.

**2 per cent. copper dusts.**—The Colombo Commercial Company's formulation was the best dust employed. It gave a fairly good control at the application rate of 5 lbs. per acre every 5 days when applied during the south west continuous rain. At 10 lbs. per acre every 5 days all formulations proved more effective than the lower application of 5 lbs. per acre every five days. Robins plain copper dust also showed fair promise.

Under the better weather conditions of the north-east monsoon all formulations except Robins plus Bentonite, gave good control. Cuprosana applied at 15 lbs. per acre every five days gave only fairly good control during the south west rains.

**4 per cent. copper dusts.**—Cuprosana was the best dust tried out. At 10 lbs. per acre every five days control was as good as spraying on 10 day rounds. Five pounds per acre every five days showed good control with no evidence of dieback, although blisters on leaves were fairly numerous.

**6 per cent. and 8 per cent. copper dusts.**—All formulations, except that of the Colombo Commercial Company, showed good control.

### Discussion

The concentration of copper, and the length of round employed in wet spraying have been worked out to give adequate protection at the minimum possible cost. "Adequate" protection does not mean complete protection, which is economically impossible. "Adequate" protection means a degree of protection which is just sufficient or barely sufficient and is a compromise between ideals and a degree of protection which is not worthwhile.

Control less effective than that given by wet spraying should, therefore, be considered as inadequate. On this assumption all the 2 per cent. copper formulations may be ruled out as giving inadequate control even at application rates of 10 lbs. every five days. 4% Cuprosana dust on the other hand showed promise of adequate control, under the conditions we may expect in normal years when 5 lbs. per acre is applied at 5 day intervals. For control as effective as wet spraying 10 lbs. per acre every 5 days may be required. At prevailing prices 6% copper dusts may be ruled out as uneconomic on tea in plucking. The barely perceptible increase in control of 6% dust over that of 4%, in the case of Cuprosana, does not warrant the increased application even if prices were lower.

### Acknowledgment

Our thanks are due to the Directors of the United Planters Co., of Ceylon, Ltd., and their agents, Messrs. Boustead Bros. Ltd., for permission to conduct the experiment on the Cairness Division of Mattakelle Estate. We are also deeply indebted to Mr. J. Mac Mahon, the Superintendent of Mattakelle Estate, who gave us every possible assistance.

Thanks are also due to Messrs. Colombo Commercial Co., Ltd., Messrs. Robins of the U. S. A., and Messrs. Imperial Chemical Industries, Ltd., for supplying dust formulations free of cost.

### Reference

- (1) Haworth, F.—Distribution of copper containing dusts. *Tea Quarterly*, Vol. XXII, part. III, Sept. 1951, pp. 118-120.

# CROP PROTECTION BY WET SPRAYING COMPARED WITH CROP PROTECTION BY DUSTING IN 1951

By

J. Lamb

At the Tea Research Institute Conference held in 1950 I read a paper<sup>1</sup> with a similar title. This article is a continuation of that paper and embodies opinions based on further experience gained during 1951.

## **Weather**

1951 was undoubtedly a year of good growth conditions. Although it was certainly favourable to the growth of the tea bush, it was not wholly favourable to the growth of the organism causing blister blight disease. These observations apply particularly to the south west monsoon zone but are equally applicable to the greater part of the tea growing areas of Ceylon.

## **Blister Blight Attack**

I have already stated that the year was not wholly favourable to blister blight disease. Even if spray protection had not been given, blister blight attack would most probably not have been so severe as it has been in previous years. However, spray protection was given over a very large area. At a rough estimate, based on the imports of fungicide and equipment, as well as on more direct information and observations, something approaching 200,000 acres received some degree of protection.

Conditions for spraying and dusting were good, and where crop protection methods were applied, success was easily achieved.

Since the suppression of each blister prevents the production of several million spores effective prophylactic treatment may be expected to have a very marked effect on an epidemic. Just as an epidemic attack builds up in geometric progression so the effect of control measures may be expected to have a very rapid effect on the general incidence of the disease. Large scale spraying and dusting may well, therefore, have had a profound effect on the general incidence of the disease in 1951, and since conditions were on the whole favourable for the retention of fungicides on sprayed or dusted leaf, it is uncertain just how severe attacks might have been if there had been no attempt at protection. When protective measures are employed over large areas, control (unprotected) plots are to some degree less liable to infection and thus less reliable as indications of the success of prophylactic treatment.

Assessment of the success of attempts at large scale crop protection during 1951 is, therefore, difficult. We must await a south west monsoon bringing with it a long period of damp dull weather before anything approaching a final verdict is possible.

## **Wet Spraying**

The recommendations already published by the Tea Research Institute have proved to be adaptable to normal estate routine. We still recommend the use of four ounces of 50% copper fungicides dispersed in 10 gallons of water to be applied



with pressure retaining knapsack type equipment. The rate of application is variable but should average 12-15 gallons per acre. Spraying rounds should not be longer than 10 days and in difficult circumstances may be reduced, with advantage, provided the plucking rounds can be adapted to allow spraying immediately after plucking. Under these circumstances the concentration of copper fungicide should be reduced in proportion.

It is most essential that fungicides should be weighed and not measured by volume. A simple postal type of spring balance enables quick weighing into convenient tins (cigarette tins) which can then be packed into rainproof boxes in numbers sufficient for a day's supply for a spraying gang. Large containers of fungicide should not be taken out into the field and exposed to rain, with the additional danger of being left with the lid off. Stocks of fungicide must be stored in dry sheds and containers should be examined for damage on arrival. A damp fungicide may not disperse properly if stored for several months before use.

I have remarked previously that success with control measures was easily attained during 1951. The standard of work in some cases would not have met with equal success in a more difficult year, and although confidence gained at the start of an operation is a valuable asset, over-confidence or under-estimation of difficulties is highly dangerous.

Wet spraying is completely dependent for its success on the use of the correct jets operated over the range of pressures for which they are designed, on proper maintenance of equipment and above all on *organisation and supervision*.

We strongly recommend that superintendents should commence the next spraying season with a revision of our published recommendations, and a "refresher course" of training for the labourers to be employed on spraying. Organisation must be reviewed and, if possible, improved. When results are not satisfactory blame the supervisor, the organisation and the labour before laying blame on the equipment or fungicide.

If we have a difficult south west monsoon in 1952, there will be many cases of disappointing results as a consequence of under-estimation of difficulties in 1951. The remedy to be applied has been clearly indicated. I wish I could recommend a method of "spraying without tears" but for some time to come spraying must remain an exacting operation.

### **Dusting**

Having offered nothing but cold comfort in my remarks on wet spraying, I wish I could offer an easy solution to the difficulties of crop protection methods for tea under this heading. There is, however, no easy method of crop protection against blister blight and dusting must not be regarded as even a possible easy solution. The application of dust reduces labour requirements but the dust itself is expensive. Results with dusting in 1951 have been quite encouraging but experiments have indicated the limitation of the method. Recent articles by Loos<sup>2</sup> and Haworth<sup>3</sup> should be studied in connection with this article. The important fact to realise is that hopes of being able to cover large areas from roads with an extensive blanket of dust is a mere pipe dream. Spectacular clouds of dust are not necessarily followed by spectacular results with protection.

Even with the best formulations of copper dust the vehicle or carrier (usually Kaolin) has very definite limitations in the power to carry the active principle (*i.e.*, copper), and it is unsound to attempt to dust bands of tea much more than 75 feet in depth. This places very definite limitations on the scope for heavy power dusting machines and points to the need for light and efficient portable machines. During 1951, hand operated dusters have proved to be extremely useful and will certainly have a very strong claim to extensive use so long as dusts are employed as vehicles for fungicides employed in Ceylon tea.

Most of the dusts tested in 1951 were totally unsuited for drift dusting over even short ranges, but those which "carried" reasonably well proved capable of giving good control of blister blight so long as they contained four to six per cent. of copper.

On tea in plucking, five pounds of four per cent. dust applied every five days gave satisfactory control. On tea recovering from pruning we are at present inclined to favour six per cent. dust applied at five-day intervals at the same rate (five pounds per acre). We still consider it unwise, however, to venture too far with attempts to control blister blight attacks on tea recovering from pruning. Trials should be limited to small areas until the reliability of dust is well established.

To sum up, therefore, we have obtained further satisfactory results with dusting in 1951, but cannot commit ourselves to unqualified commendations of copper dust for blister blight control purposes until further detailed trials have been carried out under the more severe weather conditions conducive to high levels of infection.

### **Limitations of Crop Protection Methods**

Although tea leaf retains copper deposited by either wet spraying or dusting quite well under conditions of light rainfall, which are fortunately the conditions most favourable to the development of the blister blight disease, it is doubtful whether really heavy downpours of rain will allow leaves to retain sufficient copper to give protection for the required period of time. When wet sprays have dried on the leaf they will stand up to heavy rain and it is probable that dust applied to wet leaves is retained better when the leaves have dried with the copper on them. Fine spray deposits will dry rapidly even on very dull humid days.

Areas dusted or sprayed during heavy rain may, therefore, give disappointing results unless they are given further protection. North east monsoon mornings with bright sunshine are ideal for spraying but work done during an afternoon downpour of the north east monsoon type is probably almost useless.

On the other hand, dust applied in sunny periods rises in convection currents and will also adhere very loosely to dry foliage. The ideal time for dusting is before 8 a.m. on sunny days when cold air lies close to the ground and leaves are covered with dew or are wet from a previous day's rain. Dull overcast days and similar days with light rain are also favourable to the retention of copper applied in dust form.

When the relative merits of dusting and spraying are being considered, it is most essential that these limitations be borne in mind.

### **References**

- (1) Lamb, J.—Crop Protection by Wet Spraying compared with Crop Protection by Dusting. *Tea Quarterly*, Vol. XXI, Part IV, p. 44, 1950.
- (2) Loos, C. A.—Studies on Blister Blight Control.  
(viii) Power Dusting with Cuprosana Dusts containing 2, 4, and 6 per cent. of copper. *Tea Quarterly*, Vol. XXII, Part IV, p. 126.  
(x) Evaluation of some Copper Containing Fungicidal Dusts in the Control of Blister Blight disease of Tea. *Tea Quarterly*, Vol. XXIII, Part I. p.
- (3) Haworth, F.—Distribution of Copper containing Dusts. *Tea Quarterly*, Vol. XXII, Part III, p. 118, 1951.



# BLISTER BLIGHT CONTROL ON DESSFORD GROUP IN 1951

By  
R. C. Gatehouse

*Apart from the results obtained in our own experiments carried out directly under our supervision, the Tea Research Institute has constantly to bear in mind the application of methods under normal estate conditions.*

*Thus, in 1950 apart from the main 200-acre experiment on Kataboola Estate, Kotmale, concerned with protection from blister blight of tea recovering from pruning, eleven other estates agreed to carry out smaller scale experiments without any direct assistance from the Institute.*

*In 1951 our main attention was directed to dusting methods as an alternative to wet spraying methods. Dusting is a much more difficult subject for research and several experiments were necessary to investigate the factors involved in, and limiting the effectiveness of, field application of fungicidal dusts. Loos<sup>1</sup> has already described a technical experiment on Dessford Group. Howorth<sup>2</sup> and Loos<sup>3</sup> have explained other limiting factors in protection by dusting.*

*Through the courtesy of the Directors of the Lunawa (Ceylon) Tea & Rubber Estates, Ltd., and their agents, Messrs. Harrisons & Crossfield, Ltd., a large scale trial with dusting on Dessford Group was made possible. Apart from preliminary advice and assistance Mr. Gatehouse was left to his own devices. A copy of Mr. Gatehouse's report to his agents was sent to the Tea Research Institute and we have received permission to publish it in the form of an article. This report has only been lightly edited to delete domestic items which would only confuse. Although we do not necessarily agree with all that Mr. Gatehouse writes, we respect his opinions and believe that they are of general interest.*

## The Protection of Pruned Tea Recovering from Pruning

Pruning this season started in July and all fields have been protected from bud-break, about one month after pruning, by spraying and dusting. Wet sprayed fields were:—

<i>Upper Abbotsford</i>			<i>Dessford</i>		
No. 7	—	8 acres	No. 1A	—	17½ acres
No. 6	—	12 „	No. 1B	—	10½ „
		20 „			28½ „

From 2½ to 5 ounces of copper per acre per pound were used in a suspension of 4 ounces "Cuprokylt" to 10 gallons water depending on the incidence of blister blight, and the fields were sprayed weekly until the fine weather in November, when they were sprayed every 10 days.

(1) *Tea Quarterly*, Vol. XXII, pt. IV, pp. 126-132 (1951).

(2) *Tea Quarterly*, Vol. XXII, pt. III, pp. 104-106 (1951).

(3) An Article by C. A. Loos in this issue.

Protection has been good on the whole, bushes near swamps or streams that were carelessly sprayed suffered from blister blight.

I would emphasise that hand-spraying is not fool-proof and the protection afforded depends to a great extent on adequate supervision. Twelve "Four-Oaks" knapsack sprayers with two charge pumps were used ; difficulty was experienced in obtaining supplies of spare parts, such as new " T " jet nozzles and strainers.

Spraying experience has shown that pressure retaining low-pressure knapsack sprayers with " T " jet nozzles and a charge pump gave the best results ; hand-pump knapsack sprayers, which are used on some of the Company estates, are wasteful and inefficient. Dusted fields were.—

<i>Dessford</i>		<i>Lorne</i>		<i>Upper Abbotsford</i>		<i>Lower Abbotsford</i>	
No. 3A	28 $\frac{3}{4}$ acres	No. 4	11 acres	No. 4	60 $\frac{1}{2}$ acres	No. 1A	37 $\frac{1}{2}$ acres
—	—	" 2A	24 "	—	—	—	—
—	—	" 3C	26 $\frac{1}{2}$ "	—	—	—	—
—	—	—	—	—	—	—	—
—	28 $\frac{3}{4}$ "	—	61 $\frac{1}{2}$ "	—	60 $\frac{1}{2}$ "	—	37 $\frac{1}{2}$ "
—	—	—	—	—	—	—	—

I was sceptical as to whether fungicides applied in the form of dust would protect tea recovering from pruning, due to the small buds in the early stages. Using 6% " Cuprosana " dust at an application of 10 lbs. per acre every 7 days and reducing this application to 5 lbs. per acre every 7 days when the shoots had formed, has given maximum protection, certainly as good as the sprayed fields mentioned above.

Personally I think I erred on the liberal side in this dusting, and that an original application of 5 lbs. per acre every 7 days increased to 7 lbs. per acre every 7 days would have given as good results. This would be reducing the maximum copper distributed from 38.4 ozs. copper per acre per mensem to 26.8 ozs, copper per acre per mensem.

The Tea Research Institute maintain that blister blight infection this season has been light compared with previous years, but in the lowest field No. 4 in Lorne, I left a small area of tea recovering from pruning unprotected and the damage was extensive.

Mr. Lamb and Mr. Portsmouth of the Tea Research Institute saw this area and admitted that the damage was severe while in the neighbouring tea of the same field, which had been dusted, the tea was quite normal with no blister blight infection or damage from this disease.

One important factor to be taken into consideration about the reputed decrease of blister blight infection this year is that in the 55,000 acres of Dimbula tea a good proportion was being protected which naturally stopped infection spreading from these protected areas.

### Conclusions

It is impossible to state whether wet spraying or dusting is the superior method of applying fungicides, each has its advantages dependent on availability of water, terrain, and labour.

Cost have been worked out on the protection of 1,000 acres of tea in plucking, yielding 700 lbs. per acre for six months of the year.



The cost of dusting varies from 13.3 cts. per lb. to 7.7 cts. per lb. depending on the method of application and strength, while the cost of wet spraying worked out at 7 to 9.3 cts. per lb. excluding the cost of extra labour which, if allowed for, more than doubled this cost.

**Fungicides.**—"Cuprokylt" used in a mixture of 4 ozs. per 10 gallons of water gave good results, the quantity of copper per acre being varied by increasing or decreasing the number of gallons of this mixture applied.

For tea in plucking in severe blister blight infection periods it was found necessary to apply 4 ozs. copper per round every 7 days giving 16 ozs. copper per mensem to obtain adequate protection. For tea recovering from pruning in similar periods it was found necessary to apply 5 ozs. copper per round every 7 days or 20 ozs. copper per mensem to get good protection.

2% "Cuprosana" dust even at 5 lbs. per acre every 5 days does not give adequate protection in fields where blister blight infection is severe.

4% "Cuprosana" dust at 5 lbs. per acre every 5 days gives excellent protection of tea in plucking and even at 10 lbs. per acre every 10 days the protection was adequate.

6% "Cuprosana" dust, except for dusting one acre in the Tea Research Institute experiment, was reserved for protecting tea recovering from pruning and at 5 to 10 lbs. per acre every 7 days gave excellent protection.

I believe 6% dust would give good protection of tea in plucking if used at the rate of 5 lbs. per acre every 10 days, and hope to try an experiment of this nature in the next south west monsoon.

The "Whirlwind" duster has worked without any trouble at all and is a most efficient power-duster. Its big limitation is that there is no method of measuring the amount of dust applied to a field except by judgment and experience.

I think this could be rectified by a mechanical feed in the dust hopper geared to the fan, so that one could know that at the maximum revolutions so many pounds of dust were issuing from the dust outlet.

**Hand Dusters.**—These were used to supplement the "Whirlwind" with success. The "Drake & Fletcher "Armada" duster was not a success because the weight of the whole machine is on the labourer's stomach and long periods of winding are exhausting; in one machine the winding mechanism was continually breaking down.

The "Orient" duster supplied by Messrs. Walker Sons & Co., Ltd. proved a much better machine, mainly because it is well balanced with the dust container behind the labourer.

In my opinion hand dusting has a big future, especially in Uva where there is generally a shortage of water, the dust guns are comparatively cheap, but again this method of dusting has to be very well supervised.

A careful watch for excessive copper content in the made tea was kept during the season; the Tea Research Institute kept a check on the copper content of the made tea from their experimental plots in Upper Abbotsford and on two occasions in July and September samples of our bulk made tea were analysed by the Tea Research Institute.

Their report in July read :—

" B. O. P.	..	..	68 parts per million copper
B. O. P. F.	..	..	71 " " " "

These figures are quite satisfactory.

September :—

" B. O. P.	..	..	50 parts per million copper
B. O. P. F.	..	..	37 " " " "

This is unusual as the fannings normally have a higher copper content than other grades.

In July maximum protection was being afforded to some 543 acres.

Finally, it is very gratifying to me that my appreciation of blister blight control on Dessford Group has proved remarkably accurate. For an expenditure of some Rs. 39,000/- on control, the crop at 704,710 lbs. is 157½ lbs. per acre up on last year, and the cost of production will be in the neighbourhood of Rs. 1.62 per pound.

I should like to express my thanks to Mr. Jodrell for his assistance and advice about dusting earlier in the year. I should also like to express my thanks to the Tea Research Institute who at all times have been most willing to co-operate and render assistance.

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## TEA SMALL HOLDINGS ADVISORY SERVICE

By

R. L. Illankoon

*Although the primary function of the Tea Research Institute is research on the culture and technology of tea, advisory work must inevitably come within the scope of its activities. The results of research are of little value unless they are translated into practice.*

*The benefits of research are passed on to estates through advice given by research officers who are thus kept in touch with practical realities. In dealing with an average estate the advice is applied to several hundred acres ; and when agency houses or visiting agents are concerned the area involved is much greater. The Tea Quarterly also plays an important role in disseminating advice and information.*

*The position with regard to small holders is quite different. In the first place, the small holder seldom seeks advice, and in the second, advice given to a small holder covers less than 20 acres at a time—often only a fraction of an acre. Clearly, therefore, an extensive service to cater to the needs of small holders is essential.*

*For some years the Tea Research Institute employed three small holdings officers but the task of dealing adequately with sixty thousand acres of scattered holdings proved to be an impossible one.*

*The Tea Research cess was recently increased by five cents in order to provide more funds for an adequate extension service. Mr. Illankoon is the officer-in-charge of the Small Holdings Advisory Service.*

The figures quoted below are taken from the Census Report of 1946, of units below 20 acres in tea in the tea growing provinces of Ceylon. Considerable acreages



have since been added by the opening of new clearings.

Central Province	..	38,036	acres
Southern Province	..	14,313	„
Province of Sabaragamuwa		15,055	„
Province of Uva	..	7,386	„
Western Province	..	1,904	„
North Western Province	..	284	„

A more detailed analysis showing the distribution of small holdings in each of the five principal tea growing provinces will be given later.

The distribution of small holdings in the provinces shows how widely scattered they are. Even with the increased staff it would seem a difficult task to give all the attention and advice that small holders require.

The success of the scheme must depend on how much enthusiasm and keenness can be instilled into these small holders, who have, hitherto, not had the benefit, due to lack of staff, of concentrated advisory work. Once this enthusiasm and keenness is created, and work is conducted on proper lines, small holders realising the benefits of this scheme will continue to maintain progress. I therefore advise the concentration of our activities in limited areas, for it is only by this means that it would appear possible to ensure some measures of success.

This concentrated effort would eliminate much waste of time on those who are not interested in improving their teas holdings. By thus working within a smaller compass, officers could hope for quicker results than would be the case if they were put in charge of widespread areas.

It has been found from experience that money and time has been spent on travelling, rather than on advisory work, when large areas have to be covered. There is, however, an exception to this in the Central Province—Kandy district—where holdings owned by different small holders adjoin each other and larger acreages could be worked by any single officer. It is clear from the reports of officers that they are unable to visit more than four holdings a day owing to the long distances by which their holdings are generally separated. It is, in my opinion, very necessary that four Provincial Officers be stationed in those provinces where there are the largest number of small holdings.

Though an officer will be stationed in a province he cannot be held responsible for all the detailed work of that province, as the area would be too big. I propose that he personally be made responsible for a particular area, either a D. R. O's division, or one whole D. R. O's division and part of another (*i.e.*, korale), depending entirely on the density of small holdings. This officer's main duty would be to concentrate on the particular area allotted to him but as a subsidiary duty he should supervise the work of Junior officers or instructors.

Though a D. R. O's division may seem small, one must not lose sight of the number of small holdings in a particular division. There may be as many as 4,000 to 5,000 holdings in some divisions.

From past experience it has been amply proved that, by stationing officers in provinces, without allocating to them a definite working area, large sums of money have been spent on paying travelling claims and very little work done. The officers responsible cannot be blamed for this state of affairs, as the areas allotted to them have been too large. When areas are too large, any advice given on a particular visit is not followed up with subsequent visits at short intervals, and is often, therefore, of little real benefit to the small holder.

After a period when it is found that progress in an area where a Provincial Officer has been working is satisfactory, a Tea-Instructor can take over from him, thus releasing the senior officer for work in fresh fields.

The work of the Instructors in these areas would be simplified by the pioneer work done by the more experienced Provincial Officers. Further, at the end of this period the area should be studded with demonstration plots, worked entirely by the small holders with very little assistance from the Institute. The work on these demonstration plots should be an inspiration to those small holders who have missed an opportunity offered them earlier and who may now make good.

These Instructors, in my opinion, should be our future senior officers and this system would afford them an opportunity of taking a greater share of responsibility.

I now give an analysis of the distribution by acreages of tea small holdings in five administrative provinces.

### **CENTRAL PROVINCE (38,306 acres).**

#### **D. R. O's Divisions**

#### **Council areas**

#### **KANDY DISTRICT (31,874)**

Udunuwara (4,003)  
Kandy Gravets (199)  
Yatinuwara (4,087)  
Tumpane (1,126)  
Harispattuwa (5,973)  
Pata Dumbara (2,554)  
Uda Dumbara (1,786)  
Pata Hewaheta (1,697)  
Udapalata (6,524)  
Udabulatgama (3,556)

Kandy (210)  
Gampola (40)  
Hatton-Dickoya (0)  
Kadugannawa (1)  
Nawalapitiya (118)  
Wattegama (0)

#### **MATALE DISTRICT (1484)**

Matale South (984)  
Matale North (115)  
Matale East (380)

Matale (5)

#### **NUWARA ELIYA DISTRICT (4948)**

Kotmale (3,509)  
Uda Hewaheta (928)  
Walapane (439)  
Four Gravets (45)

Nuwara Eliya (27)

### **SABARAGAMUWA PROVINCE (15,055 acres)**

#### **D. R. O's Divisions**

#### **Council areas**

#### **RATNAPURA DISTRICT (6,525)**

Kuruwita Korale (1,506)  
Nawadun Korale (700)  
Kukul Korale (429)  
Kolonna Korale (449)  
Atakalan Korale (276)  
Kadawate & Meda Korales (3,076)

Balangoda (84)  
Ratnapura (5)



### **KEGALLE DISTRICT (8,530)**

Galboda & Kinigoda Korales (2,992)	Kegalle (1)
Paranakuru Korale (2,570)	
Beligal Korale (605)	
Dehigampal Korale & Lower	
Bulatgama (1,200)	
Atulugam & Panawal Korales (1,162)	

### **SOUTHERN PROVINCE (14,313 acres)**

D. R. O's Divisions	Council areas
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#### **GALLE DISTRICT (8,177)**

Bentota Wellallawita Korale (920)	Galle (2)
Wellaboda Pattu (319)	Ambalangoda (0)
Four Gravets (823)	
Talpe Pattu (2,419)	
Gangaboda Pattu (3,046)	
Hinidum Pattu (648)	

#### **MATARA DISTRICT (6,115)**

Morawakkorale (3,337)	Matara (0)
Kandaboda Pattu (465)	Weligama (0)
Gangaboda Pattu (366)	
Weligama Korale (1,947)	
Wekkaboda Pattu and Four Gravets (0)	

#### **HAMBANTOTA DISTRICT (21)**

Girawa Pattu West (21)	Hambantota (0)
„ „ East (0)	Tangalle and Beliatte (0)
Magam Pattu (0)	

### **UVA PROVINCE (7,386 acres)**

D. R. O's Divisions	Council areas
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#### **BADULLA DISTRICT (7,386)**

Bintenne Pattu	Badulla (49)
Wiyaluwa (241)	Bandarawella (15)
Udakande (5,106)	
Yatikanda (1,157)	
Wellassa (0)	
Buttala (16)	
Wellawaya (802)	

### **WESTERN PROVINCE (1,904 acres)**

D. R. O's Divisions	Council Areas
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#### **COLOMBO DISTRICT (127)**

Hapitigam Korale (2)	Colombo (0)
Alutukuru Korale North (a) (1)	Awisawella (10)
„ „ North (b) (5)	Dehiwala Mt. Lavinia (0)
„ „ South	Gampaha (0)

# COLOMBO DISTRICT (Contd.)

Siyane Korale West	
Meda Pattuwa (18)	Ja-Ela (0)
Siyane Korale West	
Andikari Pattuwa (0)	Kollonnawa (0)
Siyane Korale East (8)	Kotte (0)
Hewagam Korale (81)	Moratuwa (0)
Colombo Mudaliyar's Division (0)	Negombo (0)
Salpiti Korale (2)	Wattala-Peliyagoda (0)
	Minuwangoda (0)

# KALUTARA DISTRICT (1,777)

Kalutara (21)	Beruwala (0)
Panadura (4)	Horana (1)
Pasdun Korale East (979)	Kalutara (0)
" " West (333)	
Raigam Korale (439)	Panadura (0)

My proposals for the distribution of staff based on the acreages in the various provinces are as follows :—

Province	Acreage of tea	Provincial Officers	Instructors
Central	38,306	2	5
Southern	14,313	1	2
Sabaragamuwa	15,055	1	2
Uva	7,386	—	1
Western	—	—	—

## MINUTES OF THE MEETING OF THE BOARD OF THE TEA RESEARCH INSTITUTE OF CEYLON HELD AT 2-30 P. M. ON FRIDAY, 21st DECEMBER, 1951, AT THE OFFICES OF THE PLANTERS' ASSOCIATION OF CEYLON, 113, STEUART PLACE, COLPETTY, COLOMBO.

*Present.*—Mr. R. C. Scott, C.B.E., (Chairman) ; Dr. A. W. R. Joachim, M.B.E., (Director of Agriculture) ; Mr. R. C. L. Notley, (Chairman, Planters' Association of Ceylon) ; Mr. R. S. Davies, (Chairman, Agency Section, P. A. of Ceylon) ; Messrs. W. H. Attfield, H. de T. Wilkinson Kay, W. Neal de Alwis, J.P., U.M., Errol Jayawickreme, H. S. Hurst and J. Lamb, (Director & Secretary).

Mr. F. C. Daniel, Superintendent, St. Coombs Estate, was present by invitation. Mr. A. H. Hall, Visiting Agent, St. Coombs, was also invited but was not able to attend.

### 1. Notice convening the meeting was read.

Letters regretting inability to be present were tabled from Messrs. A. D. McLeod and A. G. Ranasingha, C.M.G., C.B.E., C.C.S., (Secretary to the Treasury)

The Chairman, on behalf of the Board, extended a cordial welcome to Mr. Lamb, the Director, who had recently returned from home leave.



2. The minutes of the meeting of the Board held on 7th September, 1951, were confirmed.

### 3. **Membership of the Board and Committees**

#### (a) **Board**

The Chairman reported that Mr. D. E. Hettiarachchi, J.P., U.M., had been nominated by the Low-Country Products Association to fill the vacancy created by the resignation of Mr. Leo B. de Mel. This was effective from 20th September, 1951.

He extended a hearty welcome to Mr. Hettiarachchi as a Member of the Board.

#### (b) **Estate and Experimental Sub-Committee.**

The Chairman reported that Mr. E. G. Groves had resigned his seat on that Committee prior to his departure from the Island on retirement and with effect from 31st December, 1951.

The Chairman expressed the appreciation of the Board for the very useful contribution made by Mr. Groves to the Institute in particular, and the tea industry as a whole, both as a member of the Board and of the Estate and Experimental Sub-Committee.

The Sub-Committee had recommended the nomination of Mr. Richard Leaning of Diyagama, Agrapatana, to fill the vacancy. Agreed.

### 4. **Small Holdings Advisory Service**

#### (a) **Estimates.**

At this stage, Mr. R. L. Illankoon, Officer-in-Charge of the Small Holdings Advisory Service, was called into the meeting and Item 7 on the Agenda *viz.*, Small Holdings Advisory Service, was taken up for disposal. Members of the Board had inspected the new propaganda unit before the meeting commenced.

The Chairman referred to the draft estimates which had been approved by the Small Holdings Sub-Committee and which had been issued to members together with the inaugural meeting of the Sub-Committee held on 1st October, 1951. The minutes of the meeting of the Sub-Committee held on 19th November had also been issued to members along with a report of the officer-in-charge.

Mr. V. G. W. Ratnayake on being invited to comment on the working of the service, said that the organisation had only been just set up and had made satisfactory progress.

Mr. Illankoon also stated that he did not wish to make any comments at that stage but would like to make a report after about 3 months.

The draft estimates of the scheme were accepted without further comment.

Mr. Illankoon then left the meeting.

### 5. **Minutes of the Meetings of the Estate and Experimental Sub-Committee held on 12th November, 1951, and 8th December, 1951**

The Chairman reported that copies of the minutes had been circulated to members who would have noted that consideration of the St. Coombs Estate estimates was the chief business of the latter meeting.

The minutes of the two meetings were accepted without comment.

## 6. Visiting Agent's Report of 10th October, 1951

The Board accepted the Visiting Agent's report of the 10th October, 1951, copies of which had been issued to members under cover of circular A12/51 of 15th November, 1951.

## 7. Finance

The Chairman stated that all items relating to Finance had been very fully considered by the Finance Sub-Committee in the morning.

### (a) Accounts for Period ending 30th October, 1951

The Chairman said that members would be glad to note that the St. Coombs Estate Account had shown a profit of Rs. 26,306/18 at the end of October and commented on the improved condition of the estate as a whole. The total crop harvested to end October was 205,735 lbs. against 116,060 lbs. at same date last year. It was estimated that the yield for the year would be in the region of 900lbs. per acre.

### (b) Estate Estimates for 1952

Mr. W. Neal de Alwis proposed and Mr. Errol Jayawickreme seconded the acceptance of the St. Coombs Estate estimates for 1952. Carried.

### (c) Research Estimates for 1952

Mr. R. C. L. Notley proposed that the Research estimates be approved. Mr. V. G. W. Ratnayake seconded the proposal which was carried unanimously.

## 8. Low-Country Sub-Station

The Chairman informed the meeting that the agreement between the Kalutara Rubber Co., Ltd., and the Board of the Tea Research Institute relating to the use of the road through Pembroke Estate was due for signing at 4 p.m. He made the following proposal which was unanimously approved :—

“Resolved that the agreement between the Kalutara Rubber Company of Ceylon, Ltd., and the Board in regard to the use by the Board of the roads through Pembroke estate leading to the bungalow and the right to draw water and to lay water pipe lines and electric transmission lines (which was prepared by the solicitors of the Board) be and is hereby approved and that the Seal of the Board be affixed to the said agreement in the presence of the Chairman, Mr. R. C. Scott, C.B.E., the Director, Mr. J. Lamb, and Mr. R. C. L. Notley, a member of the Board.”

The meeting was then adjourned for the signing of the agreement.

## 9. Annual Report of the Board for 1950

The Chairman said copies of the report (in draft form) had been issued to members. He thought it covered very fully the activities of the Board for 1950. The report was approved without comment.

## 10. Staff

### (a) Mr. J. Lamb—Director.

An invitation to visit the Tea Research Institute of East Africa had been extended to Mr. Lamb and it was suggested that he should fly to East Africa in early March, spend 2-3 weeks in Africa and complete the journey to the United Kingdom by air. Arrangements have been made for Mr. Lamb to return to Ceylon by sea in May before Mr. Portsmouth was due to commence his leave.



The Board authorised the Director's visit to Africa.

(b) **Mr. C. A. Loos.**

The Chairman reported that Mr. Loos was due under the terms of his scholarship to commence duties at Rothamsted on the 1st of April, 1952.

(c) **Mr. B. N. Webster—Mycologist.**

The Chairman reported that Mr. B. N. Webster had since his appointment gained some valuable experience under the general supervision of Dr. S. P. Wiltshire, Director of the Commonwealth Bureau of Mycology. He had spent several weeks at various research centres including East Malling, Long Ashton, Rothamsted and Cambridge.

Mr. Webster was due to arrive in Ceylon on December 25th.

(d) **Dr. W. J. Dowson.**

The Chairman reported that Mr. Lamb had visited Cambridge where he met Dr. Dowson and Prof. Brooks. Dr. Dowson was agreeable to come out to Ceylon for two months in June/August 1952 to help and advise Mr. Webster and also generally to advise the Director on the programme of pathological research.

Members were all agreed that the proposed visit of Dr Dowson would be of the greatest benefit to the Institute and approved the terms and conditions under which he was to come out to Ceylon.

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### **Any other Business**

(a) **Junior Staff Provident Fund**

In accordance with the wishes of the Auditors as expressed in their report on the accounts for 1950, it was proposed that the payment of the sum of Rs. 27,600/04 being amount paid to members so as to bring up to 15% the Institute's contributions on salaries earned from the commencement of the 11th year of service should be minuted. Agreed.

(Sgd.) J. LAMB

Secretary.

Tea Research Institute of Ceylon,  
St. Coombs, Talawakelle.  
19th February, 1952.

## NOTICES

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The Institute's Laboratories and Offices are situated at St. Coombs, Talawakelle, and all applications and enquiries should be addressed to the Director, Tea Research Institute, St. Coombs, Talawakelle.

Specimens and other consignments sent by rail should be forwarded to Talawakelle Station c/o Messrs. M. Y. Hemachandra & Co., Forwarding Agents. *Carriage should be pre-paid.*

**Visitors' Days** The *second* and *last* Wednesdays in each month have been set aside as Visitors' Days, at St. Coombs Estate and also at the T. R. I. Sub-Station, Gonakelle Estate, Passara, when it is hoped anyone interested will visit the Stations.

### **Rules for the Occupation of St. Coombs Guest House**

- (1) The Guest House is normally intended for the use of persons visiting the Institute and St. Coombs Estate on business. Children can in no circumstances be accommodated.
  - (2) Permission to occupy a room for the night must be obtained from the Director in writing and, unless sufficient notice be given, accommodation cannot be guaranteed.
  - (3) All visitors must sign the Visitors' Book on arrival.
  - (4) A bedroom may not be occupied for more than one night if required by another visitor. This shall not apply to Members of the Board or of Committees meeting at St. Coombs who shall also be entitled to priority in the allocation of accommodation when on official business.
  - (5) Complaints or suggestions shall be entered in the book provided for the purpose and not made to the Guest House Staff. All payments due for services rendered shall be made in *cash* to the Guest House Keeper and a receipt obtained from him on the official form. The scale of approval charges is posted in the building. The Guest House Keeper is forbidden to give credit or to accept cheques.
  - (6) All breakages will be charged for at cost price.
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